WIND INPUT, SURFACE DISSIPATION AND DIRECTIONAL PROPERTIES IN SHOALING WAVES

Hans C. Graber
RSMAS - Applied Marine Physics
University of Miami
4600 Rickenbacker Causeway
Miami, FL 33149-1098
Phone: (305) 361-4935, FAX: (305) 361-4701
Email: hgraber@rsmas.miami.edu

Mark A. Donelan
RSMAS - Applied Marine Physics
University of Miami
4600 Rickenbacker Causeway
Miami, FL 33149-1098
Phone: 305-361-4972; FAX: 305-361-4701
mdonelan@rsmas.miami.edu

William M. Drennan
RSMAS - Applied Marine Physics
University of Miami
4600 Rickenbacker Causeway
Miami, FL 33149-1098
Phone: 305-361-4798; FAX: 305-361-4701
will@kiowa.rsmas.miami.edu

Award #: N00014-97-1-0348

LONG-TERM GOAL

We wish to improve our understanding of the physics and interactions which govern the spatial and temporal evolution of surface waves in finite depth water.

SCIENTIFIC OBJECTIVES

To measure the direct wind forcing of waves as they advance into shallow water.

To measure the evolution of the wavenumber spectrum as the waves shoal.

To estimate the kinetic energy dissipation in the surface waters.

To determine the dependence of the energy and momentum input into shoaling waves on the wavenumber spectrum and the wind.

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
30 SEP 1997		**00-00-1997 to 00-00-1997**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Wind Input, Surface Dissipation and Directional Properties in Shoaling Waves	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **University of Miami,Rosensteil School of Marine and Atmospheric Science,4600 Rickenbacker Causeway,Miami,FL,33149**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**Same as Report (SAR)**	**3**	

To determine the dependence of wave dissipation on the wavenumber spectrum and the rate of shoaling.

To determine the directional response of the wavenumber spectrum on surface current shears and variable bottom bathymetry.

APPROACH

An extensive field program is planned to study the spectral balance of shoaling waves. A triangular array of spar buoys will be used to acquire observations of meteorological variables (wind stress and stability), directional wave spectra, and mechanical energy dissipation in the water. In addition, measurements of these quantities as a function of fetch, as well as direct measurements of the wind input to the waves, will be obtained from a small SWATH ship. These measurements will be used to estimate source terms for wind input and wave dissipation. The measured spectral evolution of the wave field will be compared to calculations based on the action balance equation and incorporating the measured source terms. An HF Doppler radar will measure surface vector currents over the same domain as the triangular spar buoy array. Combining the current measurements with the spectral wave data will be used to estimate the intensity of wave-current interactions and high-resolution bathymetric data will be used to study the variability of wave transformation due to small-scale variations in the bottom topography.

WORK COMPLETED

1. Preliminary plans for field experiment in the fall of 1999 off Duck, NC have been discussed with all participating investigators.

2. A web site has been established for the DRI Shoaling Waves participants to disseminate experimental plans and time tables and coordinate measurement strategies. The web site is located at **http://kiowa.rsmas.miami.edu/duck99**

3. The prototype air-sea interaction spar (ASIS) buoy has been modified to accommodate higher sea states. The buoy will be deployed for FETCH, a European-funded ERS-2 validation experiment in the Mediterranean Sea.

RESULTS

None yet.

IMPACT/APPLICATION

None.

TRANSITIONS

None.

RELATED PROJECTS

The ASIS buoy was deployed in the northeastern Gulf of Mexico as part of the NASA scatterometer (NSCAT) validation experiment. We have obtained a unique data set of several simultaneous wind and wind stress observations with different instrumentation (e.g., sonic anemometer, four levels of cup anemometers, a subsurface deployed WOTAN sensor, a colocated NDBC 3-m discus buoy and the NSCAT scatterometer) to establish the open ocean flux-profile relationships. In addition, high-resolution directional wave spectra and near-surface three-dimensional currents were also measured.

As part of a european-funded ERS-2 validation experiment, called FETCH, the ASIS buoy will be deployed for one month in March 1998 in the Gulf of Lyon at a TOPEX cross-over point. The measurements of the ASIS buoy will be used to study the onset and evolution of the Mistral and the sea state bias in altimetry.